Uraloporella Korde from the Lower Carboniferous of South Wales

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Synopsis

Uraloporella Korde, 1950 is recorded for the first time in Britain. It occurs in the Lower Carboniferous Llanelly Formation (Arundian?) of south Wales. A plot of its dimensions compares well with that of *Uraloporella variabilis*. The taxonomy of this problematical microfossil is reviewed and aspects of its occurrence and environmental distribution are discussed.

Introduction

The fossils described here were discovered during the course of examining material from the Lower Carboniferous Llanelly Formation of south Wales (see Wright 1981*a*), a thin peritidal and alluvial unit of probable Arundian age (Institute of Geological Sciences 1976), which outcrops along the north-east part of the South Wales Coalfield (George 1954, Wright 1981*a*).

The Llanelly Formation was originally named the Calcite Mudstone Group by George (1954) but was later renamed the Llanelly Formation (George *et al.* 1976). George (1954) named the upper limestone part of the unit the *Linoproductus* Oolite, but specimens of that brachiopod are rare and the oolite was renamed the Penllwyn Oolite Member by Wright (1981*a*). George also recognized a persistent, coarsely bioclastic unit at the base of the oolite which he named the *Composita* Bed. The brachiopod *Composita* is rarely found in this bed but the problematical tubiform microfossil *Uraloporella* Korde is often abundant, locally making up 40% of all allochems, hence the bed has been renamed the *Uraloporella* Bed (Wright 1981*a*).

The *Uraloporella* Bed is a buff-weathering bioclastic limestone which varies from a few cm to 50 cm thick. It is a moderately to poorly sorted, often coarse-grained bioclastic grainstone containing intraclasts, peloids, quartz sand and fragments of brachiopods, crinoids, foraminifera, ostracods and the dasycladacean alga *Koninckopora*, as well as *Uraloporella*. This bed, traceable throughout the outcrop of the Llanelly Formation, has been interpreted as an open marine transgressive 'surf zone' deposit and further details of its composition and detailed locality information can be found in Wright (1981*a*).

Systematic description

MICROPROBLEMATICUM, *incertae sedis*

Uraloporella variabilis Korde, 1950
Figs 1, 2

The skeletal remains consist of small, straight cylindrical tubes, up to 1 mm long, 63–400 μm in diameter and with thick calcareous walls 11–71 μm in thickness (see Figs 1, 2). Wall thickness increases with increasing tube diameter (Fig. 3). The wall is micritic to fibrous in

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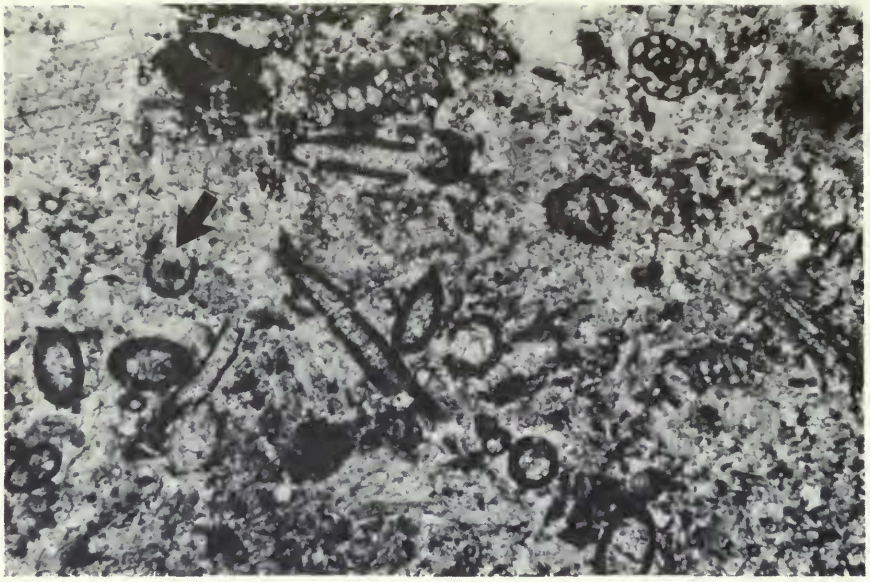

Fig. 1 *Uraloporella*, transverse and longitudinal sections. Note the patchy recrystallization of walls (arrowed). *Uraloporella* Bed, Clydach Halt Lime Works (National Grid ref. SO 2342 1261; Wright 1981*a* : 352). British Museum (Natural History) Dept Palaeontology, reg. no. V.60809a. Field of view is 4 mm wide.

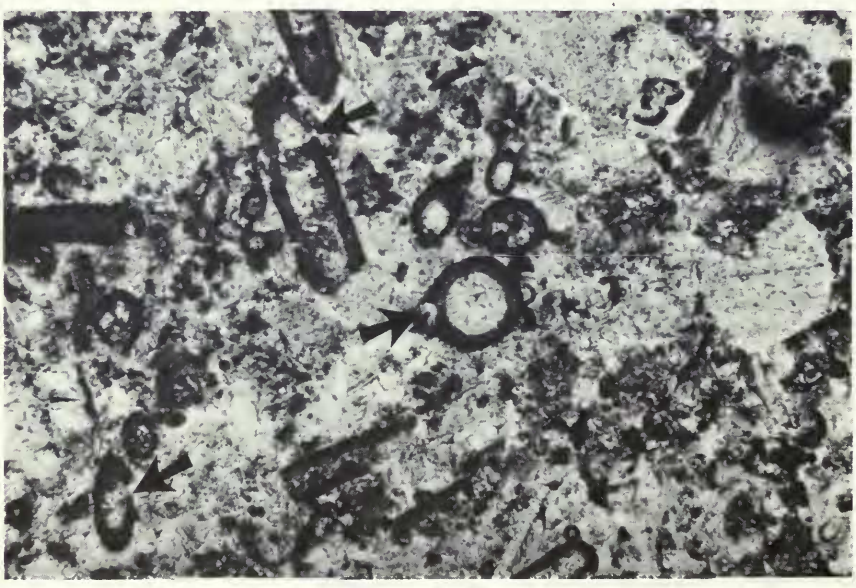

Fig. 2 *Uraloporella* showing speckled wall structure and partial recrystallization of walls (arrowed). Note cloudy matrix. *Uraloporella* Bed, Pwll-du Quarry (National Grid ref. SO 2495 1170; Wright 1981*a*: 348). British Museum (Natural History) Dept Palaeontology, reg. no. V.60808a. Field of view is 4 mm wide.

structure and appears to have been prone to recrystallization, often having diffuse edges. No branched tubes have been seen. Poorly preserved septa occur but are not common. The sparry calcite matrix surrounding the fragments is cloudy (Figs 1, 2); this is partly owing to the presence of crinoid fragments with syntaxial overgrowths but appears to be mainly because of the patchy recrystallization of the tubes. Details of the neomorphic fabrics are difficult to elucidate.

The features described above are consistent with the emended diagnosis of *Uraloporella variabilis* Korde (Riding & Jansa 1974 : 1412), although as Fig. 3 shows these Carboniferous forms are slightly larger than those described from the Middle Devonian of Germany (Faber & Riding 1979) and the Middle–Upper Devonian of Alberta (Riding & Jansa 1974). Recrystallization has probably destroyed many of the smaller forms. Comparisons between these Carboniferous forms and material from the Devonian of Alberta shown to me by Robert Riding (Cardiff) confirms the identification as *Uraloporella*. This microfossil was interpreted as a dasycladacean alga (Korde 1950) but has been reinterpreted as a possible foraminifer belonging to the Nodosinellidae (Riding & Jansa 1974 : 1422). Termier *et al.* (1977) have classified *Uraloporella* in the Moravamminida, an order of their class Ischyrospongia (Porifera).

This microfossil has been recorded from the Middle Carboniferous of the Urals (Korde 1950), the Cantabrian Mountains of Spain (Racz 1965) and arctic Canada (Mamet *et al.* 1979); the Givetian–Frasnian of Alberta (Riding & Jansa 1974) and Western Australia (Riding & Jansa 1976); the Givetian of the Eifel, West Germany (Faber & Riding 1979) and the Frasnian of the Holy Cross Mountains, Poland (Kaźmierczak & Goldring 1978). Thus *Uraloporella* has a range from Middle Devonian to Middle Carboniferous (Moscovian) or even to the Lower Permian (Sakmarien) (see Mamet *et al.* 1979).

The recognition of the Devonian representatives as *Uraloporella* has been challenged by Mamet & Roux (1975), who reclassified the Albertan (Devonian) specimens as a new form *Jansaella ridingi* Mamet & Roux. They rejected the Albertan forms as *Uraloporella* because, they claimed, the type material of *Uraloporella* does not have regularly-spaced septa. From my own examination of the Albertan forms, and the Lower Carboniferous forms described here, and from the descriptions of Riding & Jansa (1976) and Faber & Riding (1979), it is clear that all these specimens are of *Uraloporella* Korde 1950 (emend. Riding & Jansa, 1974). These microfossils show variable preservation of the septa, so that some forms show regular well-preserved septa (e.g. Riding & Jansa 1974 : pl. 1, fig. 2), while others show very poorly preserved septa as in the topotype material from the Ural Mountains (see Riding & Jansa 1974 : pl. 2). Mamet & Roux (1975) have called the better-preserved forms *Jansaella ridingi*. This problem clearly shows the need for the careful differentiation of diagenetic effects from primary, biogenic features, as the author has stressed elsewhere (Wright 1981*b*).

Stratigraphical and Environmental Distribution

As a result of their narrow definition of this microfossil Mamet & Roux (1977 : 247) state that *Uraloporella* is not known below the Middle Carboniferous. But using the emended diagnosis of Riding & Jansa (1974) the genus occurs in the Arundian (Viséan) limestones, and obviously in the Devonian. What is unusual about the range of this form in the Arundian limestones is that it only occurs at one horizon; it has not been found below in similar lithologies in the Llanelly Formation and is also absent in the overlying oolitic lithofacies of the Penllwyn Oolite Member. Since this form has a wide stratigraphical range its restricted distribution here is difficult to explain, but it is obviously a very useful marker locally.

One reason why this microfossil has not been previously recorded in Britain may be that since it is rather prone to recrystallization, losing its radial wall structure, it can easily be misinterpreted as a micritized brachiopod spine. Mr R. Barraclough (University of Leeds) has informed me that some of the problematical 'mud-mounds' in the Lower Carboniferous

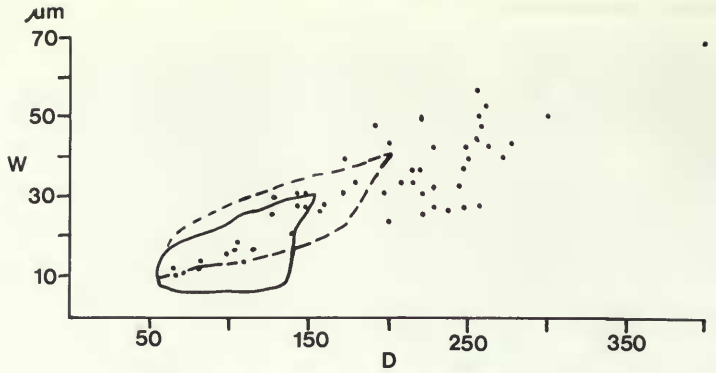

Fig. 3 Plot of the dimensions of *Uraloporella* from the *Uraloporella* Bed at various localities. W, wall thickness; D, external tube diameter (μm). The solid line marks the limit of distribution of the Middle Devonian forms from Germany (Faber & Riding 1979 : fig. 3), and the dashed line marks the limit of distribution of specimens from the Devonian of Alberta (Riding & Jansa 1974 : fig. 5).

of northern England contain large numbers of poorly preserved brachiopod spines (*Uraloporella*?) but are not found with brachiopod shells. Possibly some of these mud mounds contain *Uraloporella* bafflestones similar to those described by Mamet *et al.* (1979) from the Middle Moscovian of the Canadian Arctic archipelago.

Uraloporella is frequently found in back-reef and restricted lagoonal deposits (Riding & Jansa 1974, 1976; Kaźmierczak & Goldring 1978; Faber & Riding 1979). In the present Carboniferous occurrence *Uraloporella* is associated with fragments of brachiopods and crinoids suggesting fully marine conditions although there is some evidence locally of schizohaline conditions at this horizon (Wright 1981*c*). Restricted lagoonal deposits are represented in the Llanelly Formation below the *Uraloporella* Bed (Wright & Wright 1981) but do not contain *Uraloporella*. The conclusion of Faber & Riding (1979) that *Uraloporella* preferentially occurs in protected lagoonal environments seems suspect and this form should not be used as a facies indicator.

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